

ALGEBRA III
WS - APPLICATIONS SEQUENCES & SERIES

NAME _____
PER _____ DATE _____

Solve each problem. SHOW WORK!!!

- 1) If a car depreciates in value \$1200 each year, what will it be worth at the end of its sixth year? The original cost of the car was \$18,600.
- 2) How many multiples of 12 are there between 16 and 415?
- 3) Find the sum of the positive odd integers less than or equal to 100.
- 4) A pile of fireplace logs has 1 log in the top layer, 2 logs in the next layer, and so on. How many logs are in the pile if it contains 21 layers?
- 5) The prize for the correct solution to a certain crossword puzzle is \$100. If the prize is uncollected, it is increased by \$5 each week. At the end of 20 weeks, how large is the prize?
- 6) A piece of paper is cut in half. Then each half is cut in half again. If this process is repeated 8 more times, what is the area of each piece compared to the original?
- 7) The population of Sunville increases by 10% each year. It is now 20,000. What will be the expected population after five years (to the nearest 100 people)?
- 8) A vacuum pump removes $\frac{1}{10}$ of the air from a space capsule on each stroke of its piston. What percent of the air remains after 4 strokes of the piston?
- 9) The teaching staff of Fairview High School informs its members of school cancellation by telephone. The principal calls 2 teachers, each of whom in turn calls 2 others members, and so on. This process must be repeated 6 times counting the principal's calls as the first time. How many teachers, including the principal, work at Fairview High?
- 10) A grocery stock boy makes a display of cans of corn for a sale. He puts 20 cans in the bottom row and each row above it contains 3 fewer cans than the previous row. He continues until there are only 2 cans in the top row. How many rows are there? What is the total number of cans in the display?
- 11) Frank has taken a job with a starting salary of \$25,000 and annual raises of 5%. What will be his salary during his fifth year on the job?
- 12) Every hour a clock chimes as many times as the hour. How many times does it chime from 1 a.m. through midnight?
- 13) The Kemps have rented a house for the past six years. During their first year of renting, they paid \$800 per month. If their rent was increased by 5% for each year after that, what is the total amount of money they have paid in rent over the past six years?
- 14) A pile of bricks has 85 bricks in the bottom row, 79 bricks in the second row, 73 in the third row, and so on until there is only 1 brick in the top row. How many bricks are in the 12th row? How many rows are there in all? How many bricks are there in all?

$$\textcircled{1} a_6 = 18600 + (6-1) \cdot 1200$$

$$a_6 = \boxed{12,600}$$

$$\textcircled{2} 24, 36, \dots, 408$$

$$408 = 24 + (n-1)12$$

$$384 = 12n - 12$$

$$396 = 12n$$

$$\boxed{33} = n$$

$$\textcircled{3} 1 + 3 + 5 + \dots + 99$$

$$S_n = \frac{(1+99)50}{2}$$

$$= \boxed{2500}$$

$$\textcircled{4} 1 + 2 + 3 + \dots + a_{21}$$

$$a_{21} = 1 + (21-1)1$$

$$= 1 + 20 = 21$$

$$S_n = \frac{(1+21)21}{2}$$

$$= \boxed{231}$$

$$\textcircled{5} 100 + 105 + 110 + \dots + a_{20}$$

$$a_2 = 100 + (20-1)5$$

$$= 100 + 95$$

$$= \boxed{195}$$

$$\textcircled{7} a_n = 20000(1.1)^5$$

$$= \boxed{32,200}$$

$$\textcircled{6} 1, \frac{1}{2}, \frac{1}{4}, \dots$$

$$a_n = 1\left(\frac{1}{2}\right)^{n-1}$$

$$= \frac{1}{2^{56}}$$

$$18,400, 17,400, \dots$$